

A Treatment arising from tradition: A Report of indigo blue therapy for granulomatous mastitis

Indigo blue and granulomatous mastitis

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Abstract

The indigo plant is used globally for its blue dye, and plant-based indigo dyeing has been traditionally practiced for centuries in a broad geographic area. In addition to this purpose, indigo is used medically in many African tribal areas for its anti-inflammatory and anti-microbial effects. This article presents a case of granulomatous mastitis that was treated by a tribal healer with indigo blue, which provided temporary relief of symptoms for one year until secondary bacterial infection occurred. Some studies reported that indigo blue provides symptomatic relief related to its anti-oxidant, anti-microbial and anti-inflammatory mechanisms, which could be helpful in autoimmune diseases such as granulomatous mastitis. We strongly believe that this patient's results warrant further investigation of indigo blue's effect on granulomatous mastitis.

Keywords

Indigo blue; Granulomatous mastitis; Indigofera

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Introduction

The indigo plant is used globally for its blue dye. The tropical plant, also known by the Latin name *Indigofera*, has 800 local species in tropical and subtropical regions. Within the indigo plant family, approximately a dozen distinct species are used for dyeing blue in various geographic regions. The plant can provide a broad spectrum of strong blue colour ranging from navy to pale blue. Plant-based indigo dyeing has been traditionally practiced for centuries in a wide geographic area including the Mediterranean Basin, Africa, the Far East, China, Malesia, India, Bangladesh, Indonesia, Java and its archipelago, South America and Peru [1]. Additionally, it is used medically in many African tribal areas for its anti-inflammatory and anti-microbial effects. This article presents a case of granulomatous mastitis that was treated with indigo blue by a tribal healer.

Case Report

A 21-year-old woman presented with a one-year history of a right breast mass at Nyala Turkish Hospital, Sudan. She had no family history of breast cancer. The patient had a two-year-old child who had been breastfed until the onset of the lesion, at which time the breastfeeding was discontinued. The patient had a history of a large lump on her breast for one year, which was treated by the village healer until the time of presentation with an unknown topical cream called zhar, which proved very helpful, greatly relieving the swelling and thickening of the breast for one year (Figure 1).



Figure 1. The breast of patient covered with zhar (indigo blue)

The woman had experienced no problem with the breast when she used the cream, but yellow drainage has formed in the past two months, which has become very painful in the past week, so she was admitted to hospital.

The woman was afebrile, and a physical examination discovered a hard, painful, mobile mass, 8 cm in diameter, affecting all quadrants of her right breast. There were nipple discharge and skin retraction. The overlying skin showed signs of inflammation as well as remarkable, very large infected skin fissures;

palpable lymph nodes were present in the ipsilateral axilla. The lesion was covered with a vivid blue dye; later, we were told that it was a specific blue dye extracted and produced from the indigo plant.

The wound was cleaned, the abscess drained, a core needle biopsy performed, and wide-spectrum antimicrobial and anti-inflammatory agents were prescribed, both orally and topically. The findings from cultures of the purulent discharge of the skin showed staphylococcus aureus, but the aspiration fluid remained sterile.

Discussion

Dyes have been used throughout history in various aesthetic and, later, practical applications. They are primarily used as colouring agents to dye materials in the cotton and textile industries, but our understanding of the importance of these substances has evolved, leading to their increased use across industry and science alike [2]. Currently, dyes are widely used and play an important role in modern electronics, in the printing industry, where they are used in electrophotography (laser prints and photocopies), and in medical applications, where they may be used to cure diseases and treat ailments [2,3]. Probably the oldest and most famous dye is indigo, which has an intense dark blue colour. The name indigo derives from the Greek endikoni, meaning Indian. It can be traced back to ancient Asian civilizations, whence it spread west across Europe, particularly in ancient Greece and Rome [2,3]. Historically, indigo naturalis (IN) has been used in China for the treatment of various inflammatory diseases and dermatitis, including ulcerative colitis (UC) [4]. Its primary active ingredients are indigo, indirubin, tryptanthrin and qingdainone. The clinical disease activity indexes and endoscopic Matts grades have been demonstrated to significantly decrease following oral administration of IN powder in patients with UC who are unresponsive to 5-aminosalicylic acid, prednisolone and infliximab treatment [5,6]. Furthermore, IN has a powerful scavenging effect on hydroxyl radicals, and its extract has been successfully used to treat clinical psoriasis [5,7] and to induce apoptosis and autophagy of acute lymphoblastic leukaemia cell lines [5,8]. Additionally, Cheng et al.'s [9] experimental study on patients with moderate psoriasis identified IL-17 as a key pathway that can be modulated by treatment with IN. That study exemplified a novel approach to understanding the mechanism of action of IN, which can be used to understand the therapeutic effect of other forms of IN. In light of these studies, we believe that the relief that the patient experienced when using indigo blue is related to its anti-oxidant, anti-microbial and anti-inflammatory mechanisms, all of which could be helpful in autoimmune diseases such as granulomatous mastitis. We strongly believe that this patient's results warrant further investigation of the effect of indigo blue on granulomatous mastitis.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical stan-

dards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

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